

THE EUGENICS REVIEW

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Voluntary Social Services. London, 1928.
National Council of Social Service. Pp. 198.
Price 2s.

THIS handbook of information and directory of social service organizations is a complementary volume to the COUNCIL'S *Public Social Services*, and should prove a useful aid to the co-ordination of all our many social service activities. Organizations are grouped under Education; Drama, Music, and other Arts; Juvenile Welfare; Holidays and Outdoor Recreation; Preservation of Amenities; Housing and Town Planning; Health and Sickness; Welfare in Industry; Oversea Settlement; Relief in Distress; Reformatory Agencies; Religious Organizations for Social Service; General Development of Social Service; Associations of Public Bodies and Professional Associations. Many of these are divided into sub-headings. E. M.

Woodbury, Robert Morse, Ph.D. *Causal factors in Infant Mortality.* Washington, 1925.
Government Printing Office. Pp. 245.

THIS most valuable and detailed analysis is based upon information regarding 22,967 live births and 813 stillbirths which occurred between 1911 and 1916 in eight American cities. The infant mortality rate from all causes in this group was 111.2 per 1,000 live births.

The chief points of interest in this report are the following:

The mortality rate of children whose mothers were known to have tuberculosis was over $2\frac{1}{2}$ times that of normal children.

The mortality rate among first-born children was higher than among second-born. The rate then increased with the order of births.

The mortality rate was highest for infants born at short intervals, and lowest for infants who followed preceding births at intervals of four years or more. The difference is attributed to factors relating to the physical condition of the mother.

The mortality among the exclusively artificially-fed averaged between three and four times that among the exclusively breast fed.

The mortality rate varied greatly among different nationalities. It was lowest among Jewish women (53.5) and highest among French Canadians (171.3) and Portuguese (200.3). These differences seem to be largely attributable to the type of infant feeding, breast feeding being prevalent among Jews and rare among races with a high mortality rate.

The infant death rate in families which lived in homes with two or more persons per room was $2\frac{1}{2}$ times that occurring in families living in homes with less than one person per room.

The death rate of infants whose mothers were gainfully employed away from home during pregnancy was 40 per cent. higher than the rate of infants whose mothers were not so employed;

the rate among infants whose mothers were so employed during the first year of infant life was $2\frac{1}{2}$ times the normal.

The death rate from all causes was highest when the father's earnings were low, and lowest when the father's earnings were relatively high.

The obvious deductions from this report are that the infant mortality rate could be greatly reduced if women did not have children unless they were in good health; if they spaced their children to intervals of three or more years; if they did not attempt to earn a living by employment outside the home either during pregnancy or during the first year of the infant's life; if they fed their infants from the breast; if they were properly housed; and if their husbands earned respectable wages. The stress, therefore, is on nurture. C. P. B.

PAMPHLETS

American History in Terms of Human Migration.
Harry H. Laughlin. Washington, 1928.
Government Printing Office.

THIS is a further extract from the evidence given by Dr. Laughlin before the Committee on Immigration and Naturalization. After sketching the migration waves which peopled America, he goes on to general considerations and practical policy. ". . . it is extremely difficult, if not impossible, to rate any of the great cultured races of the world as superior or inferior. Even if we include savage races, we still find difficulty. . . . Superiority must be considered in connection with the conditions under which races live."

He condemns radical race-crosses, but commends near crosses, and defines racial and cultural assimilability as the test of a desirable immigrant—hence the need to bar coloured immigrants. But good family stock is of more importance than race, and he therefore pleads for the examination (including pedigree examination) in the country of origin of all would-be migrants. E. M.

Eugenic Sterilization in California. Paul Popenoe.

10. *Attitude of the Patients' Relatives toward the Operation.*

11. *Attitude of Patients Toward the Operation.*

12. *Social and Economic Status of the Sterilized Feeble-minded.*

DR. POPENOE is here continuing his series of precise and detailed investigations into sterilization in California, the one place where it has been carried on on a large scale and where accurate records have been kept. The mass of clear and unimpeachable data he is collecting is invaluable.

The eleven pages of No. 12 are so packed with pregnant detail that it is almost impossible to review it adequately without reprinting it *in toto*—it should be read. The main findings are:

(1) The fathers of 485 feeble-minded individuals sterilized in the Californian institution at Sonoma rank socially and economically about the same as the fathers of 725 mentally deficient children in the schools of Munich.

(2) While the parentage of these patients is fairly representative of California as a whole, "the small intellectual stratum (chiefly professional classes), which produces most of the bright children in the public schools, furnishes much less than its quota of mental deficiency."

(3) The fathers of both German and American groups of M.D.'s are markedly differentiated in socio-economic status from the parents of bright children, and still more from those of the world's greatest geniuses.

(4) "Apparently the greatest number of institutional feeble-minded are the children of skilled labourers, not of paupers or of the casual labour class. The same is true of the retarded school-children of Munich. This is primarily because skilled labour makes up the largest single element (nearly one-half) of the population." It should further be added that the skilled labour class "may also be more interested in sending its defectives to an institution . . . than is the shiftless, defective family in which the parents are not themselves much above the level of institutional admission." Indeed, the intrinsic weakness of such a survey, as Dr. Popenoe fully realizes, is that a home for the defective is never representative—" . . . the well-to-do family may keep its defective child at home . . . Sonoma gets more than a fair share of the delinquent feeble-minded, and of those who come from broken families or have been supported by charity, together with . . . foundlings."

However, it does seem clear that (as in the case of the insane) in sterilizing a defective, there is no fear of cutting short a strain of genius, nor even of talent. Dr. Popenoe also concludes that sterilization is indicated as a measure to be applied to definite individuals who "must be selected because of their own personal and ancestral peculiarities, not because their family falls in some particular occupational group of the population"—a conclusion which scarcely needs the support of this study. At the same time, there is no doubt from other studies that amelia is very frequent among the 'pauper' group, much more frequent, generally, than in any other class.

From the other two pamphlets it appears "that not more than one operation in 10, and perhaps not more than one operation in 20" is performed without the consent of the patient or relatives. The latter "in an overwhelming majority of cases, appear to be well satisfied that the operation has been performed. . . . Inquiry brought

to light only a few cases in which sterilization had caused friction in a family. In none of these could a serious result be ascribed definitely to the operation."

Social workers with first-hand experience were virtually unanimous that the law was working well. Of the few sterilized ex-patients (not feeble-minded) who answered a questionnaire, 19 were "displeased or regretful" (only one of these gave a cogent reason—past the menopause), 22 were indifferent, and 132 were satisfied or pleased.

Pamphlets 10 and 11 are reprints from the May issue of the *Journal of Social Hygiene* (U.S.A.), and No. 12 from the June issue of the *Journal of Applied Psychology*. They and all others of the series can be obtained from Mr. E. S. Gosney, 26 No. Marengo Avenue, Pasadena, California, who is financing and directing the whole scheme of investigation. E. M.

Sterility in American Marriages. A. J. Lotka.

Reprint from *National Academy of Sciences*. Vol. XIV. No. 1.

THE data on which this study is based are the publications of the United States Census Bureau. The conclusion reached is that the *net* sterility of American white wives is 13.1 per cent. No attempt has been made to determine which of the two partners in the marriage is responsible for the sterility, or to ascertain the causes thereof.

C. P. B.

The Cause of Foetal Deaths in 144 Cases. Palmer, A. C. Stationery Office, 1928. Price 3s.

OF the 144 cases here dealt with, foetuses were macerated and 105 non-macerated. Of the 39 macerated foetuses, 14 were syphilitic. Of the remaining 25, 11 died as a result of maternal toxæmia, 1 of maternal heart disease, 1 of foetal malformation, and 12 of unknown causes. Of the 105 non-macerated foetuses, 27 died as a result of maternal disease, 5 of malformations, and 73 of the effects of labour.

C. P. B.

PERIODICALS

Annals of Eugenics.

Vol. III, parts 1 and 2, April, 1928. *Fresh evidence on the inheritance factor in tuberculosis.* By Percy Stocks.—In this study an ingenious and novel use is made of the mean square contingency. If pairs of children (siblings) are classified according as one, both, or neither is tuberculous, using double entries in a four-fold table, it is shown that the mean square contingency of the table may be interpreted as the square of increased probability of the second child being tuberculous if the first is found to be tuberculous, and *vice versa*. Stocks argues

that if infection alone were the cause of association this increase in the probability of tuberculosis should be the same in families with and without tuberculosis in the parents or other relatives; whereas, if heredity were an important factor the value should be higher in the tuberculous families. This he finds to be in fact the case in the data provided.

These data, like most medical statistics, leave a good deal to be desired, since the number of pairs of siblings both free from tuberculosis is not a direct observation but an artifact built up from general rates. A point for theoretical criticism is that the fundamental theory is based upon a simple fourfold table, while the actual values presented have been obtained from ninefold tables, in which pulmonary and other forms of tuberculosis are separated. It is not obvious that the mean square contingency from such ninefold tables has the simple interpretation derived from the fourfold table.

The reviewer would not have expected the increased probability of tuberculosis due only to infection to be independent of the state of the parents, but to be lower if the parents were infected; this point, however, only goes to strengthen Stocks' argument.

On the relative values of the factors which influence infant welfare, by E. M. Elderton.

Part III of this huge memoir extends with its appendix from page 96 to 193. The greater part of this space is occupied by presenting contingency tables such as that for the health of fathers and children in cases recorded at Blackburn.

Health of infant	Health of father		Total
	Good	Not good	
Good	161	28	189
Fair	114	23	137
Poor	66	34	100
Total	341	85	426

From each of these tables an estimate is made of the correlation between the two variates, and these all have the rare virtue of being provided with a probable error; thus the table above is assigned a coefficient of correlation $+0.2745$ with a probable error .0410. In this section of the work at any rate there is no discussion of the methods by which these correlations were obtained, or in what way they are to be regarded as important. The reader is tacitly expected to accept them as a final summary of these 426 cases in respect of the multitude of circumstances which conspire to associate the health of a father with that of his children.

Are there 426 cases? Or does the same father appear repeatedly in the classification in conjunction with several children? We are not told, but it may be inferred that 426 real and separate families are to be considered, since it is implied

elsewhere that the infants are all just one year old. Then in what way were these cases obtained? To what extent do they represent the infants of Blackburn? Perhaps we are told this in earlier parts of the memoir, but information of this sort, vital as it would seem to be in the interpretation of any result, does not appear. The correlation, or rather the estimate of it, stands unqualified.

In the aggregate, an enormous number of these coefficients of correlations are calculated, and all seem to have the health of the infant as one variate. These are compared as to magnitude. Thus at Rochdale the correlation found between *Habits of the parent* (Good *v.* Indifferent) and health of infant at six months increased from 0.44 in 1909 to 0.59 in 1910. This instability is ascribed to the fact that in 1910 there was the beginning of an outbreak of summer diarrhoea. Here is a glimpse of the actuality behind the figures. The correlation coefficient springs up 30 per cent. at the onset of an epidemic; would it not have been valuable to know what other causes may have had an equally great effect upon other correlations? But is it the true explanation? We cannot tell, but the proportion of infants classed as delicate is actually much smaller in 1910 than in 1909. Have the standards of classification changed? Does this affect the correlation?

It is impossible not to appreciate and to commend the amount of labour which has been put into this and similar investigations, yet we cannot but feel that the methods and style adopted show a mistaken view of the use and limitations of statistical methods. Statistical methods are above all useful in the critical scrutiny of such bodies of data as are here used; they will serve to ascertain exactly what information the data provide; to what questions, and how precisely they will furnish an answer; to show where supplementary information is required, and to build up a technique of more adequate inquiries. These questions seem here to be totally neglected. The question of improving the classifications on which the tables are based is not discussed, and the reader is told nothing of the hazards of deducing correlations from contingency tables. Nor is there any comprehensive attempt to formulate a theory of infantile health in relation to the controllable and uncontrollable elements of family life.

R. A. FISHER.

British Journal of Psychology

April, 1928. This journal contains among other articles four papers on *Social Constructiveness*. F. C. Bartlett, who writes the first article, considers that when a custom, etc., comes into a social group from without, it is changed, not only by assimilation, simplification, and retention, but positively in the direction along which the

group happens to be developing at the time. This latter he considers to be social constructiveness. It is clearly shown when different elements from diverse sources come to a group and are welded together.

J. T. MacCurdy hesitates to accept the idea of a group as possessing ability to alter and shape new customs. Is the ability in the minds of the individuals forming the group or in the group itself, an entity distinct from the mere addition of its individuals?

W. E. Armstrong points out that the behaviour of any group may be analysed into three components, which may be called the "human response" (response similar to other members of the group), the "cultural response" (response similar to some of the members, not to others), and the "individual response" (response determined by life-history, etc.). The only changes of culture which can be called constructive are the result of individual responses, responses which are no doubt individual responses to outside influences.

A. C. Haddon discusses the problem from an anthropological standpoint. He sees no necessity for the hypothesis of a group mind nor that the group has the tendency to develop in a certain direction. Illustrating his points from primitive races, he shows that the great suggestibility of the savages combined with the uniformity of their social behaviour, needs only the stimulus of an idea from an individual to start combined action.

J. N. Langdon and E. M. Yates, in an investigation on transfer of training in manual dexterity, found that the effect of training was specific rather than general.

M. COLLINS.

British Journal of Psychology July, 1928.

Journal of Delinquency March, 1928.

The Heredity of Orphan Children.—In both these journals Mr. Robert A. Davis, Jr., describes a study made in 1926 of the intellectual status of over a thousand orphan children in Texas. The 'Delinquency' article deals with the distribution of intelligence, as shown by Dearborn and Haggerty group tests, among the children in the six orphanages examined, together with that among a group of ordinary primary school children. The orphanage children show a retardation of $2\frac{1}{2}$ years at the age of 13, as compared with a retardation of 8 months among primary school children in the same State. Other studies of the social class from which dependent children are usually drawn would lead one to expect a result of this kind. Mr. Davis's presentation would have been more interesting and also more valu-

able if he had given the results for boys and girls separately. The recommendations which the author bases on his findings—i.e., of accurate knowledge of the intelligence of the orphans on the part of their guardians, of institutions carefully adapted to their needs, of vocational guidance, and of careful recording—would seem so much to be merely common sense as to be hardly worth stating, if one did not know that they were made after a careful study of the conditions.

The article in the *British Journal of Psychology* is more ambitious, and attempts to throw some light on the problem of heredity versus environment. As is usual in studies of this kind up to the present, the biological evidence is both slight and contradictory. A higher intelligence-correlation for siblings in their homes than for siblings in institutions points in one direction: the fact that unrelated institution children do not seem to grow more alike with length of residence points in the other. The difference in correlation (.4 as compared with zero), between orphanage siblings and unrelated children is, though suggestive, not conclusive evidence, as the median age of entrance into the institution was 8 years, and the median length of residence there 3 years. For work of this kind it is absolutely necessary to catch the children young, and from the environmental point of view a child of 8 is not young.

EVELYN LAWRENCE.

British Medical Journal.

June 23rd, 1928.—A case is recorded of a woman in Hong-Kong with congenital absence of right ovary and fallopian tube. Before the condition was discovered she had given birth to two normal girls and to one boy who had complete atresia of the oesophagus.

June 30th. *Mongolism in a Twin.*—Dr. H. Armstrong, Senior Physician, Royal Liverpool Children's Hospital, notes a case of one of twins being a Mongolian imbecile, the other child of the opposite sex being normal. He suggests three causes of Mongolism: (1) that it is inherent in the unfertilized ovum; (2) that it is imparted to the ovum at fertilization; (3) that it is acquired after fertilization. He adduces in favour of (3) that Mongols are often the subjects of congenital abnormalities, such as the heart and cataract, on the grounds that such defects obviously cannot "occur till embryonic development has proceeded far enough to start the formation of the organs implicated" (a not very convincing argument). Of the three theories he favours the first.

July 14th. *Inheritance of Tuberculosis.*—An epitome of an account in the *Bull. Soc. d'Obstet. et de Gynécologie de Paris*, March, 1928. C. Mönckeborg, E. Onetto, and J. Vergara, as a result of investigation on 22 cases, conclude that a tuberculous mother may, and frequently does, infect

her child with tuberculosis. The infection may occur during pregnancy.

July 21st. *Etiology of Mongolism.*—Dr. J. M. Mackintosh suggests that there are five phases in the life of each ovary: (1) the period of immaturity; (2) a short period of pre-maturity, in which the ovum is fertilizable but incapable of developing into a perfect embryo; (3) the period of sexual maturity; (4) a short period before the menopause in which the ovum is still fertilizable but no longer capable of producing a perfect embryo; (5) the period of final degeneration after the menopause. The phases (2) and (4) are obviously those in which there is a risk of producing the Mongolian type. He adds that his theory would of course be invalidated by a proved case of uniovular twins of which one was a Mongol and the other a normal child.

The great majority of his cases were either the first child of a very young mother; or the first and only child, often, but not always, born of a late marriage; or the last child of a family, generally born of a mother nearing the menopause.

Aug. 18th. *The Falling Birth Rate.*—In a discussion on this subject at the annual meeting of the B.M.A., Dr. F. A. E. Crew expressed the opinion that the human being was now approaching the end of a birth rate cycle. The birth rate would not rise again until the factors overriding the inherent tendency to increase were recognized and removed. The root of the matter in the human being was probably to be found in social conditions. Among the socially unsuccessful the only outlets of nervous release were excessive drinking and sexual over-indulgence. In such classes the reproductive rate would be high; social advancement implied other outlets and a lower reproductive rate. But birth control, which prevented the birth of individual babies, did not have much effect on the gross birth rate.

Sir Thomas Horder doubted whether the falling birth rate came within the province of the medical practitioner. Lady Barrett was of the opposite opinion, and considered that arrangements should be made for teaching medical students the subject and their responsibility therein. Dr. William Collier advocated the establishment of birth control clinics. Dr. Letitia Fairfield objected to the eugenicist putting upon the doctor his so-called laws. Dr. Binnie Dunlop expressed the opinion that couples in the poorest classes should be encouraged to have not more than two children.

Aug. 25th. *Syndactylism in Four Generations.*—A full report with photographs is given of syndactylism occurring in a great-grandmother, grandmother, mother, maternal aunt, maternal uncle (stillborn), and patient herself. The patient exhibited also polydactylism of both feet—a supernumerary digit on the tibial side of the big toe of each foot. The patient and her

mother also had a slight nasal deformity—a flattening of the terminal cartilage.

Aug. 25th. *Hermaphroditism.*—Mr. Harold Hartley, Surgeon to the North Staffordshire Infirmary, reports the case of a person aged 22. Her appearance was that of a well-developed female, but she had never menstruated, although each month there was malaise, and aching in head, back, groins, and breasts. Is 'courting.' Other members of the family are said to be abnormal. In left groin there was a lump which on pressure caused nausea and sometimes vomiting. Operation for hernia was performed and the lump removed. The vagina was roomy but no cervix, uterus, or ovary could be felt. On opening the abdomen no ovary, tube, or uterus, could be found. Microscopically the lump proved to be a testis showing actual, though irregular, spermatogenesis. Some of the sections seemed to be comparable to ovarian tissue. The individual is being brought up as a female, and has been 'left in ignorance of her most unhappy fate.'

A. A. E. N.

Bruxelles-Médical.

July, 1928. *La Mortinatalité et la Mortalité dans le Limbourg.* By Dr. P. Clerck.

Le Soignage à Domicile des Débiles Congénitaux. Dr. V. Possemiers.—Dr. Clerck contributes a paper dealing with the question of infant mortality, especially in Limbourg, and, from a rather different standpoint, Dr. Possemiers considers the same subject. In the first paper great stress is laid upon the need for adequate ante-natal care, including not only medical supervision during pregnancy but also emphasizing the vital need for improved conditions of living and education of the mother in the hygiene of daily life. The housing in the country districts contrasts unfavourably with that in the towns, though these too in many cases leave much to be desired. The remedies for the high mortality are to be found in an organized pre-natal care service and in a general improvement in housing conditions.

Dr. Possemiers, too, advocates a far-reaching organization for ante-natal care and education as a means of race improvement, but he urges it especially from the medical point of view, so that the physician will know with what hereditary disabilities the unborn child may have to contend on its entry into the world, and be ready to guard against them. Undoubtedly such a knowledge of family history is of much assistance to the physician, though the author's optimism may be unduly great as to the possibility of controlling these inherited disabilities.

August, 1928. *La Loi Belge de Défense Sociale à l'égard des anormaux et des récidivistes envisagée au point de vue eugénique.* By Dr. Louis Vervaeck.—The trend of the new Belgian regula-

tions for the treatment of criminals is definitely to recognize a large proportion of crime as the symptom of disease and to deal with the offenders accordingly. One of the chief points to which attention is drawn is that the detention of the mentally unsound criminal is of indefinite duration under suitable medical supervision, and that his release is in the first instance probationary and confirmed only after a year of satisfactory social behaviour. The recidivist, after serving his term of imprisonment, is detained in a labour colony for a period whose length depends upon that of his original sentence. It is hoped that these regulations will have the two-fold effect of protecting the community by the segregation of these dangerous members, and also of placing the anti-social individuals under conditions where medical care and education may develop their social qualities.

L. M. C.

Bulletin de la Société d'Etude des Formes Humaines.

December, 1927.—This number publishes another instalment of Dr. Leon Mac-Auliffe's *La Personnalité et l'Hérédité*, which is to appear in book form this year. The author is inclined to believe that certain psychological characters are governed by Mendelian laws of inheritance. Professor V. Bounak discusses morphological characters invariably linked with normal physiological variations. Professor Charles Fraipont of Liège (*Un Document sur l'hérédité*) sets an example that should be widely followed, by publishing an account of the causes of death in four generations of his family.

Phénomènes héréditaires dans des portraits de famille, by Professor J. F. Van Bemmelen, is an interesting study of the recurrence of facial traits in eight generations of the writer's family.

B. A.

No. 1-2, 1928.—This may be called a cancer issue; we can only give here a very brief *résumé* of each article.

The Morphology of the Cancerous. By J. Jacquin.—Human morphological types can be classed in several categories, among which—according to the classification of Mac-Auliffe—are the "fat" and the "thin." The fat types, or those akin to them, seem predisposed to cancer. Their cells, watery and easily tumefied, would be very apt to form cancerous tissue. Among 19 cancer subjects, Jacquin found 18 of the fat or square-built type, 1 of the thin.

Léon Mac-Auliffe's own contribution is particularly interesting because he gives photographs of several cancer subjects. These enable one to study the morphological types; and one series, of particular note, show the subject at various ages, before and after the appearance of cancer. Some are of different members of the same family, all of them attacked by cancer. It was extremely

difficult to obtain such a collection, and Dr. Mac-Auliffe should be congratulated and urged to continue his work. He points out that the first and principal manifestations of cancer generally appear in the morphological feature which characterizes each type. Thus, among the "stout-digestive" cancer most often appears in the alimentary canal or in its embryological offshoot, the genital apparatus.

Professor Viola thinks he can state that if his system of classification of human morphological types ("brachymorphes," "longilignes," "normo-types," normal that is to say, and "compound")* is followed, an almost complete absence of normal and compound types would be found among the cancerous. On the other hand, there is an abundance of the "brachymorphes" and "longitypes," especially of the latter. But "the statistics are still much too few to justify any definite conclusions." Viola recalls that Giovanni, the founder of the Italian School of Morphology, believed cancer to occur more frequently among the "digestive."

Pende also recalls the opinion of Benecke, and himself adheres to it, that cancer is more frequent in the "digestive" type (Mac-Auliffe's "fat").

The present writer has many times suggested a statistical and biological study of morphological types in their bearing on cancer, and has even drawn up a plan. One must, to begin with, have statistics of the morphological types in the general population, then in each race (e.g., in the group *Homo Mediterraneus* or *Alpinus*, in *Homo Nordicus* or *Dinaricus*, etc.) and finally in the group of the victims of cancer. One could then see which are the most frequent morphological types in any named population and of which race. One might then be able to make useful comparisons.

Cancer and the New-born Child. H. Vignes.—In general, the weight of the newly-born of cancerous women is about the normal. If, in particular, one compares the children born of cancerous women with those born of tuberculous women, one is struck by the fact that the first have a normal weight much more often than the latter.

A. NICEFORO.

Fortschritte der Medizin.

August, 1928. *Die kriminellen Anlagen und ihre Erblichkeit.* By Dr. Max Grünewald.—A brief summary is given of what may be called the seasonal incidence of crime and also of the physical features that are commonly associated with criminality. From the eugenic standpoint the interest of the paper lies in its reference to Fetschner's scheme, which is in operation in Saxony. Under this the particulars of every

* "Brachymorphe," or big type, roughly corresponds to the "digestive" of Sigaud and the French school, and to Mac-Auliffe's fat type. "Longitype" roughly corresponds to Mac-Auliffe's thin type.

offender whose imprisonment is of three months duration or longer, are listed in a card index, together with as much information as can be gleaned concerning his family. By this means, in a few years data of the greatest interest will be amassed, from which much valuable information regarding the transmission of criminal tendencies may be obtainable.

L. M. C.

Genetica.

What do we know of the Descent of Man? By J. P. Lotsy.—It is quite impossible for us not to make guesses at the origin of man, but as the data is so scarce on which those guesses, politely called hypotheses, are founded, it is just as well that no stones should be thrown.

Lotsy believes in crossing as the origin of variations, because he has seen what it can do and because he believes "how hopeless it is to trace phylogeny from morphological characters only, even in so simple a case as the *Tragopogon-cross*" (p. 312). But he shall be criticized in his own words, p. 326. "The origin of mankind is still unknown, the character of the reconstructions made of his genealogy depend entirely on the views of those who made them, and the results will show at a glance whether the author is at heart, a Lamarckian, a Darwinist, a Mutationist, or a Hybridologist."

This is a grave condemnation of scientists, who should certainly not allow themselves to be imprisoned in such clearly labelled pigeon holes.

The author makes a valuable appeal that we should study hybrids between races, "in order to leave reliable records to those who come after us." That has recently been done in the Sandwich Islands and in the West Indies, but much material is yet untouched. But Lotsy does not seem to realize that the necessary basis for the study of hybrids is an accurate knowledge of the characteristics, with their range of variation and their method of inheritance of the races that go to make the hybrids. For example, in his illustration on page 321 we should have to know the variation and method of inheritance of straight and curly hair within each tribe before any bold statements could be made about it when inter-tribal mating takes place.

Unfortunately we know very little of the method of inheritance of normal characters within any race. O. A. MERRITT HAWKES.

Journal of Applied Psychology

April, 1928. *The Organization of Mental and Physical Traits During Adolescence.* By Fowler D. Brooke.—No very close relationship between physical and mental traits was found on testing 1,118 individuals whose chronological ages ranged from thirteen to twenty years. Only small positive correlations were obtained. The data give no support either to the view that any

physical trait is the symptom of all or of a significant number of mental traits, or that mental and physical traits are related inversely to one another. The writer concludes that his results give no support to believing in a general maturity factor of which some one mental or physical trait is symptomatic; but that they indicate that maturity is more or less specific.

June. *The Measurement of Social Intelligence.* By Thelma Hunter.—THE article discusses a test devised to test social intelligence. The six parts of the tests are, judgment in social situations, memory for names and faces, recognition of mental states from facial expressions, observation of human behaviour, social information, and recognition of the mental state behind words. The author discusses the results of each of the six parts in turn. The reliability of the whole test is .89, and it correlates .61 with a rating scale filled up for 98 employees.

Social intelligence does not seem to include abstract intelligence. Beyond a certain amount of general ability, high intellectual ability does not include high social ability. Social intelligence also has a very low correlation with mechanical intelligence. Thorndike's three types of intelligence, social, abstract, and mechanical, seems therefore to exist quite definitely.

On the whole, social intelligence does not seem to correspond markedly with age, although certain factors show increase with age.

Women are of higher social intelligence than men. Men are superior in social information and women surpass men in judgment in social situations and in observation of human behaviour.

M. COLLINS.

Journal of Genetics.

Vol. XIX, No. 3, May, 1928.—*Genetic studies in *Ricinus communis* L.* By J. E. Peat, B.Sc.—The castor oil plant appears to be a suitable one for genetic studies. It is easily grown and quick growing in tropical countries; there are a number of well marked varieties which cross readily. The haploid number of chromosomes appears to be only ten.

The present paper gives a description of the effects of about a dozen factors, some having been primarily described by Harland. The colour of the vegetative parts is determined by three factors, of which two, M and G, react according to the scheme

	M	m
G	Rose	Green
g	Mahogany	Tinged

while the third E modifies these colours to "blush" shades.

Three factors B, C, and D affect the waxy bloom of the stems, leaves, and capsules, and of these B is linked with M in inheritance—the only

case of linkage so far established in this plant. The amount of pigment on the seeds, and its distribution in dots and blotches have revealed three more factors. Non-viable albino seedlings appeared in some families, and seem to be due to a single recessive character. Two morphological characters which depend on single factors are the spiny or spineless capsules, and the normal or excessive laciniation of the leaves. Of these the first shows no dominance, while the dominance of the normal leaf form is imperfect.

Vol. XX, No. 1, July, 1928. *The Inheritance of Dwarfing in Gammarus chevreuxi.* By E. B. Ford.—The value for genetic studies of this little shrimp, found in brackish waters at Plymouth, lies in the possibility of following the course of development of the different mutant characters which have been found to arise. In a study of the red-eyed forms Ford and Huxley had already shown that at least four different mutations have occurred which determine different shades of eye colour from red to black, and do so by altering the time of onset of melanic deposition, the rate at which it is deposited, and the final density at which equilibrium is established.

The dwarf mutant which is the subject of the present paper is a simple recessive, and interacts in an interesting manner with the development of eye pigmentation; for whereas in the non-dwarf darkening proceeds very gradually from the fourth to at least the fiftieth day after extrusion, the dwarfs become completely black, in the central parts of the eye, at about 11 days. The later-formed peripheral facets, however, darken gradually as in the non-dwarf forms. It appears as if the amount of pigment available in the earlier stages is independent of the dwarfing factor, and, concentrated in a smaller eye, rapidly produces the full black hue, while at later stages its development is slowed proportionately to the slower general body growth.

R. A. FISHER.

Journal of Heredity

June, 1928. *Success and Family Size.* By F. A. Woods.—This is a continuation of previous work which indicated that those successful in life had larger families than the unsuccessful, and that, therefore, "mental evolution is going on to-day."

The present study is chiefly of the fertility of the English peerage, which is divided into "old" families (male line traceable as early as 1450), and "new" families (not traceable before that date). The living representatives of both groups are then divided into "service" and "non-service," i.e., those who have been useful, if not also distinguished, to society, and those who have, apparently, done nothing in particular. It is, of course, a very rough classification and open to many individual errors; the peer, for instance, who owns 50,000 acres and has managed them himself as a good landlord should, would be classified as

"non-service," though he has been both useful and able—as Dr. Woods himself realizes. But in the mass the classification is probably fair.

The results are interesting and encouraging. The "service" peers (526) have an average of 2.44 children, while the "non-service" (135) have only 1.95. Dr. Woods anticipates the objection that even 2.44 children are not enough to secure racial survival, by pointing out that the records are not of children born, but of children surviving—they must, indeed, be all about thirty by now, since the fathers in both groups were born between 1841 and 1885. This, however, rather vitiates his conclusion that mental evolution is going on to-day. What, we must now ask, is the fertility of these grown-up children?

The total number of sons killed in the war was 100, 87 of the "service" and 13 of the "non-service"; an instance of the dysgenic influence of war, since the ratio is higher among the "service" than the "non-service." This in itself is an interesting example of the inheritance of an instinct for public usefulness; and it is also remarkable that, despite the disproportionate casualty list, the survival rate still remains higher among the "service" families.

July.—A comparable study to the above is made by N. J. Butt and Lowry Nelson. 382 Elders of the Mormon Church (all over 44 years of age) were divided into three groups—those who had attended elementary school, high school, and college. "The mean children alive for the three groups, beginning with the lowest, was 6.6, 6.3, and 5.5. That is, the percentage survival was 85.7, 86.3, and 88.7."

In a study of 855 parents in two Utah towns the correlation between education received and children born was 0.09, the mean number of children ranging between 5.3 and 6.5. The differences between educational groups were not consistent. The authors conclude that the effect of education upon sterility has been greatly exaggerated, probably as a result of statistics "gathered from highly selected groups by means of the partial returns usually secured by the questionnaire method or from equally incomplete alumni records." They consider that their own data, secured through the survey method, "should bear as much if not more weight." Factors which, in their opinion, have far more influence than education upon fertility include "vocation, social attitudes of the group, inherent physical vigour, economic considerations. . . ."

There is weight in much that they say, and their material is extremely interesting. But the work has several grave faults, not the least being the haphazard obscurity of the writing and the slovenly method of presenting the statistics. The worst fault is the provincial narrow-mindedness of the two writers. Members themselves of Brigham Young University, they present these studies of the Mormon State and imply that they are representative of America! For confirmation they

appeal to Griffing's *Education and Size of Families in China*! The second is probably no more absurd than the first, for the Mormon community is in every way peculiar and is in many respects living the life of the beginning of the last century. The mere fact that the Utah families are about double the size of those in almost every other white community should have warned them they were dealing with unusual material.

E. M.

Mental Hygiene.

July, 1928.—*The Mental Health of College Women.* By A. F. Riggs, M.D., L. W. B. Terhune, M.D.—This article is an account of an interesting experiment in psychiatric work which has been conducted at Vassar Women's College during the past five years. The students were lectured on mental hygiene subjects by eminent neurologists and others, and individual work was done amongst the 1,100 students by a resident psychiatrist. The results have been most satisfactory, the students for the most part came readily for help, and very varied problems of mental trouble and maladjustment were dealt with.

E. I. C.

National Health

August, 1928. *Psychology and Mental Development of Children.* By Dr. W. A. Potts.—This contains a lucid and readable description of the causes and symptoms of mental deficiency, as well as an effective answer to the frequent assertion that the certification of mental defect depends upon the point of view of the individual examiner. Dr. Potts and Dr. A. F. Tredgold made separate investigations in different parts of the country of the incidence of mental defect. "Our reports, printed separately without any collaboration, showed an agreement as to the percentage of mental defect in the ordinary population to the second decimal point. This agreement was confirmed by thirteen other investigations subsequently carried out in different parts of the country."

E. M.

Nature

August 4th, 1928. *Cancer Problems.*—A very useful review of the main points raised at the International Conference on Cancer. "The outstanding piece of progress in respect of our knowledge of the origin of fresh cancers . . . is the cumulative realization of the importance of chronic irritation and injury and the progressive implication of the products of burnt coal as the most effective irritants known."

The daily and weekly Press, which is terribly scared of heredity, ignored Miss Maud Slye's experiments on mice. By selective inbreeding

she has developed two groups of mice from the same original stock. In one group almost every individual now develops tumours, in the other almost none. She has shown that the incidence of fresh cancers is partly dependent on heritable qualities.

It is particularly valuable thus to have the constitutional factor illustrated by way of complement to the stress now laid, sometimes rather too much, upon the importance of irritation. In applying her work to man, however, it is necessary to remember that mice are peculiarly susceptible. The present article states that "in human experience heredity is negligible"—a rather misleading statement unless read in conjunction with the final summary, "The practical problem of cancer prevention may perhaps be more fruitfully phrased as, Why does not everybody have cancer? rather than as, Why do some people have cancer?" This is a happy way of expressing what appears to be the growing view, that cancerous tendencies are hereditary in most of us. A lucky few are genuinely immune, but the fate of the majority is decided by the presence or absence of irritants. The article makes no mention of the tendency for cancer to appear, in this or that family, in some particular part of the body.

Not, unhappily, a problem to be solved by natural selection, since cancer is a disease of the post-reproductive period. For the same reason it is beyond the reach of practical eugenics.

August 11th.—The discovery here recorded of a fifth lethal factor in cattle is important. Like at least two—and probably three—of the others it occurs in the Holstein-Friesian cattle. "Matings of heterozygous bulls and their daughters produce one hairless calf in seven (98: 12 or 14) according to expectation. The calves have a pink colour owing to the blood vessels, and the skin is in an embryonic condition except a few areas on the muzzle, eyelids, ears, and legs, which produce hairs. Their teeth and hoofs are normal, but they die a few minutes after birth."

It was apparently first attributed to foot-and-mouth disease, but has now been definitely traced to a few heterozygous bulls which spread it as a recessive character.

E. M.

Quarterly Review of Biology

Dec. 1927. *The Growth of Populations.* By Raymond Pearl.—There is little here which is not contained in Pearl's book *The Biology of Population Growth*, which was reviewed in this Journal (Vol. XVIII, No. 1) by Mr. G. U. Yule, the only new matter being a preliminary report on a new method of experimenting with *Drosophila* populations by moving the imagoes every three days into a fresh bottle, and adding

to them all further imagos which hatch out in earlier bottles. In this way the maximum population of his "Logistic" curve is reached and maintained, which is not the case with his earlier methods, but with violent oscillations due, as he suggests, to the optimal food conditions.

Perhaps a word of warning may be given as to the "logistic" curve and its application to populations of various kinds, including human populations. It is a curve rather similar to the Galton "Ogive" or integral of the normal curve—i.e., if we represent population vertically and time horizontally on a graph, the population rises slowly at first and then faster and faster up to the middle of the curve, forming an initial concave portion; at the centre the curvature changes over and the increase proceeds less rapidly and then more and more slowly, until a maximum population is approached asymptotically, this portion of the curve being convex.

Now it is demonstrable that if certain definite relations hold between the rate of increase at any point in time and the possible food supply, or space occupied, or some such limiting factor, a population must increase according to this logistic curve; and in such cases—e.g., yeast which, according to the late Professor Adrian Brown, is limited by the oxygen supply, or if that be in excess by the sugar in solution—it is quite correct to talk of the logistic "law." In the case of such experimental populations as those of *Drosophila* investigated by Professor Pearl and his school the term is probably permissible, though further work must be done to see whether the conditions which produce them are such as must necessarily lead to a logistic curve of increase. On the other hand, to talk of a logistic "law" of increase in human populations is as misleading as to talk of the normal "law" of error; the simple conditions which necessarily lead to the curves are at best only approximated to in either case.

That logistic curves can be fitted with close approximation to these populations is not disputed; of course they can be, a curve with four constants at our disposal with both convex and concave parts is a very convenient instrument, but the integrals of many "cocked hat" curves would doubtless give just as good fits, though the fitting would be more troublesome. It has, however, been remarked that the universe was not necessarily arranged for the convenience of mathematicians.

The parallel with the normal curve of error is very close: both curves can be derived from ideal conditions of their problem, and both are convenient from a mathematical point of view and can be used to describe facts with a greater or less approximation to the truth.

Furthermore both tend to be objects of veneration if not of worship (even the late Professor Edgeworth was once irreverently described as having "sat on the fence and cuddled the normal

curve" during a discussion on skew curves at the Royal Statistical Society), and in both cases this veneration may lead to misunderstanding among those who are not familiar with their use. In the case of the "logistic" curve there is a tendency among the more ardent disciples to believe that the maximum population may be forecast by its use. Such a claim is not, I need hardly say, made by Professor Pearl.

Curve fitting is great fun, but it is possible to overlook obvious facts in the attempt to express results in mathematical form.

For instance, Professor Pearl quotes in this paper from Pearl and Parker who found that the number of *Drosophila* imagos produced per female per day (y) varied with the number of adult flies present (x) according to the equation

$$y = 34.53e^{-.018x} - .658x$$

and states that "this equation describes the observed facts with extraordinary precision. Rarely even in a physical or chemical experiment does one get closer agreement between observation and *theory* than is here shown. Plainly the curve is the expression of the *law* relating these two variables, rate of reproduction and density" (my italics). Yet he has not drawn attention to the fact, nor has Yule, who found the matter puzzling, observed, that for the greater part of the curve the actual number of imagos produced was effectively constant. There was a short period at the beginning when there were not enough females to cover the ground and possibly another period at the end when either too many eggs were laid or there was too much interference by other flies for the females to function properly, but from three pairs up to twenty or thirty pairs the number of imagos produced was, within the experimental error, the same. *Between these limits* the number of eggs which produce imagos is not appreciably affected by the population or even by the number of females, but seems to depend merely on the area on which eggs may be laid or perhaps with rather greater likelihood on the volume of food available for the larvae which are hatched out; and the curve is practically the simple rectangular hyperbola $y = c/x$ where x is here the female population only.

To show this, it is only necessary to divide the sixth column of table ix in *The Biology of Population Growth* by the number of bottles given in the description on page 133, where however there is a misprint* of three for two bottles with ten pairs. The following are the numbers of imagos per bottle:

* Otherwise the surviving males exceed the number originally put into the bottles.

Pairs.	Total imagos produced per bottle in 16 days.	Pairs.	Total imagos produced per bottle in 16 days.
1	337	9	529
2	281	10	428
3	469	12	582
4	525	15	463
5	396	20	555
6	509	25	388
7	488	30	424
8	499	50	237

It will be interesting to see what will happen when Professor Pearl repeats this experiment with the new method of changing bottles; it seems likely that quite another "Theory" will have to be deduced from his figures to express a very different "law."

June, 1928. Evolution and Mortality.—Professor Pearl here discusses the organological classification of the causes of death among reptiles, birds, and mammals in the London "Zoo," and finds that there is a progressive tendency for death to occur owing to breakdown of organs derived from the ectoderm and mesoderm and that deaths due to organs derived from the endoderm decrease as we rise in the scale of evolution.

The table embodying the results is as follows :

The distribution among the three primary germ layers of each 100 organologically classified deaths.					
Germ layer.	Rep- tiles.	Birds.	Mam- mals.	Man (S. Paulo)	Man (Eng. & Wales).
Ectoderm	·7	·1	1·0	7·2	11·0
Mesoderm	7·7	11·6	13·5	28·0	35·2
Endoderm	91·6	88·3	85·5	64·8	53·8

The regularity of the table is remarkable, but in view of the artificial conditions of a "Zoo" the author looks upon the results as suggestive rather than probative. This attitude will doubtless meet with approval when it is pointed out that the percentage of deaths in the years under discussion were as follows :

Year.	Reptiles.	Birds.	Mam'ls.	Mammals who have survived six months.
1920	20·1	19·8	32·1	16·1
1921	24·5	20·4	21·4	10·0
1922	21·6	20·0	27·7	14·4
1923	31·9	21·1	26·1	13·4

I have had the privilege of discussing the paper with Dr. B. B. Ferrar, Superintendent of the Dublin "Zoo," who tells me that there they have almost abolished tubercle as a cause of death by restricting the diet of the carnivora to horse and goat and cleaning and ventilating the cages. Such deaths as do occur from tuberculosis are, he thinks, usually traceable to human infection. On the other hand, the large number of deaths due to trouble in the alimentary tract are generally from acute enteritis brought on by unsuitable additions to the official menu, contributed voluntarily or involuntarily by the general public.

STUDENT.

Revue Anthropologique.

April-June, 1928.—Professor Ch. Fraipont of Liège contributes a valuable account of the establishment of the teaching of anthropology on a proper footing in that University. Physical Anthropology was made an optional subject in the Faculty of Natural Sciences in 1927—its first appearance on the programme of a Belgian State University—and in February of the present year a scheme was presented to the Minister of Education, with the support of all the faculties concerned, for the establishment of a doctorate in anthropology.

The author of *La Veillée du Mouchon dans le Haut-Jura au XVIIIe Siècle* gives a neat example of the influence of economic conditions on social custom. On certain lands in the Haut-Jura belonging first to the Abbey, and later to the Bishopric of Saint Claude, the tenants were *mort-mainable*, and could bequeath real or movable estate to direct descendants only, failing which the property passed to the feudal superior. To avoid this loss a father would not allow his son to marry until he had got the bride with child, and a youth was sometimes obliged to have intercourse, under parental sanction, with several girls until he had secured the succession.

B. A.

Scientia.

May, 1928. *Zur Gestalttheorie. Antwort auf Herrn Rignanos Kritik.* By W. Köhler; and *Zur Gestalttheorie, Antwort auf Herrn Köhlers kritische Erwiderung*, by E. Rignano.—These two articles form the sequence to Rignano's detailed criticism of the Theory of Shape which appeared in *Scientia* towards the end of last year. In the first named Köhler, who represents what has been called the 'unitarian' development of Gestalttheorie (the Berlin School as contrasted with that of Graz) takes Rignano to task upon several heads.

His article is somewhat polemical. He complains of Rignano's insufficient acquaintance with the literature of Gestalt; a literature which has already grown to formidable proportions, a large and important part of which is not fully in accord with the views of Köhler himself. He criticizes Rignano for having confused the several senses, abstract and concrete, in which the term Gestalt is used in the German language, as well as for a similar confusion with regard to the German word Sinn. More serious than mere philological dispute, he attacks Rignano's associationistic view that 'wholes' are created out of sensory elements by reason of affective reactions to them and mnemonic associations with them.

In the second article Rignano meets Köhler's objections and criticisms one by one. He insists, as he did before, on the many significations and shades of signification of the term Gestalt, not only in a less technical sense, but even as employed by the different schools of 'formalists.' The fact tends to confusion and obscuring of the issues. Though he does not mention the psychologists of Graz or Leipzig, he examines Köhler's own use of the term, and shows that it is obscurantist, in that a 'group' or formal unity, or configuration, pre-supposes independent elements which are grouped or unified in some way within it. Köhler, who looks to a physiological theory for an explanation of the psychological 'Gestalten,' of course denies that any psychological theory requires the occurrence as such of any independent primary sensory data. Rignano likewise requires a physiological theory in connection with his associationism.

The two opposed views developed in these articles have epistemological, as well as psychological implications. Though Köhler remarks that Kant would have rejected with horror any attempt to father this version of Gestalttheorie upon his apriorism, there can be no doubt that it is to be classed epistemologically with subjective theories. Indeed, some versions of 'formalism' claim affinity with Kant. But subjective theories are anathema to Rignano, who is preoccupied with the objectivity of empirical observations similar for all observers, with the objectivity of the conclusions of logical reasoning to which all assent, and with the objectivity of scientific laws and truths universally recognized.

It seems to the reviewer that to base objectivity upon other observers, their assent or recognition, is to involve the very question at issue. None the less, for Rignano the sensory data are objective and presented as objectively associated together. In perception they are completed by mnemonic evocations. Nothing is said as to the inadequacy of these, nor of the doctrine of correlate evocation. Nevertheless, so completed, the resultant percepts have no signification as objects or things until one or other of our affective tendencies comes to be associated with them and thus further to cement them together. Köhler, indeed, reproaches Rignano with his doctrine of significance. Rignano, however, makes it clear that in his view the 'whole' of perception and the 'whole' of significance are to be distinguished, and that both occur. He appeals to introspection; and puts forward an eloquent plea for the value and the necessity of dealing with psychological problems by the introspective method.

Certainly, in this question of Gestalt introspection would appear to be absolutely necessary. Such experimental work as has been done needs interpretation as well as data objectively obtained. Associationism apart, whether the Gestalten arise consciously by way of a one step or a two step process (or, if significance be added, by way of a three step process) is a problem which, in the present state of psychological knowledge, appears not to be definitely settled one way or the other.

F. AVELING.

Social Service Bulletin

July, 1928. *The Unknown Years.* By E. S. Griffith and R. A. Joseph.—A profoundly interesting survey of the problem of juvenile unemployment, based upon the records of a group of Liverpool boys. A large part of this problem lies outside the range of eugenics, but the percentage of unemployed and casuals of the different school-leaving standards has biological significance:

Standard when leaving.	Percentage, Casual or Unemployed.
Ex-7th	13
7th	23
6th	28
5th	47
4th or 3rd	50

	7th or ex-7th.		6th and under.	
	No.	Per cent. of group.	No.	Per cent. of group
Employed	86	55.1	70	44.9
Casual	6	42.9	8	57.1
Unemployed	18	36.0	32	64.0

The article continues, "Clearly we have here an important predisposing cause of unemployment. An earlier study . . . showed 111 unemployed boys with a mental test median index of brightness of 62, compared with 78 for a similar number employed." E. M.

Volksaufartung, Erbkunde, Eheberatung

No. 4.—The most interesting thing in this little journal is accounts of clinics which have been established by the municipal and provincial authorities in Germany for giving advice to those about to marry. In nearly every such centre the person in charge is the M.O.H. for the district or town concerned, and consultations are primarily on medical matters. But it would appear that genetic issues are not overlooked, and to judge from the opinions expressed in this journal, German eugenists have great faith in securing race progress by getting more and more emphasis laid on the genetic advice given at these establishments. The journal before us publishes a list of fifty such "Eheberatungsstelle" in Prussia alone. M. S. P.

CORRESPONDENCE

To the Editor, *Eugenics Review*.

SIR,—I should like to comment upon some of the statements made in the review (p. 125) of Professor Raymond Pearl's latest book, *The Rate of Living*.

(1) "The logistic curve is comparatively unimportant beside the main discovery that population is regulated by its own density—when, that is, the food supply is ample." Malthus's *Essay* prepared one to appreciate that each time our ancestors made a big advance in food production (as hunters, herdsmen, agriculturists, pioneer settlers, machine users, scientists) they temporarily reduced their high death rate, and their population growth must thus each time have actually or nearly followed a logistic curve. Again, neo-Malthusians after 1910 were constantly pointing out that the declining birth

rates were invariably accompanied by an equal or almost equal decline of the death rates, thus leaving the survival rates entirely or almost entirely unaffected—an unpopular demonstration, because it showed that excessive death rates were still due to food shortage and therefore could only be reduced by lowering the birth rate or by directly accelerating the food rate. What I disagree with is not the logistic curve, which usefully indicates that population growth has been controlled by the food supply, but with the suggestion that the decline of birth rates has been mainly due to a reduction of the physiological capacity to produce offspring, as seems to have happened in experimental populations of *Drosophila*. "Population is regulated by its own density" solely because increasing density, in consequence of the Law of Diminishing Returns, tends to make the food supply less and less "ample."

(2) "When, in 1877, the population of England and Wales reached a certain pitch of density, the birth rate fell." Why, then, did not the birth rate of India, China and Japan fall when their populations reached that pitch of density?

(3) "It is at least significant that the decade 1870-80, when the [English] birth rate turned, was the only decade during the last seventy years when the [English] housing situation worsened." This would not account for the downward turn of Europe's birth rate, which began in that decade.

(4) "Another provocative fact is that Catholic, uncontraceptive Connaught has the same birth rate as Protestant, contraceptive England, though this same end result is achieved in different ways." The long-standing low birth rate in Connaught has not been due to any loss of fertility, as is shown by the large families of the elderly married couples. It has been mainly due to the heavy emigration of young adults.

(5) "Birth control, where it is effective, appears only to have raised the marriage rate without affecting the crude birth rate at all." Birth control is not birth control unless it be effective in reducing the number of births; and, unfortunately, it is doubtful if marriage rates have become higher since 1876. But surely there can be no doubt that contraception has been the main factor in reducing birth rates. Europe's birth rate began its decline suddenly, and immediately after the great Bradlaugh-Besant case. Again, economic conditions are practically identical in the provinces of Holland, yet the Roman Catholic ones have the higher birth rates.

(6) "The biological problem is why and how fertility falls, in flies and men, when population reaches a certain density." But a people do not become physiologically incapable of preventing a fall of their birth rate after the population has reached a certain density.

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